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HANDWORK OF THE SARAFIS INDIANS, ECUADOR
FROM AN ORIGINAL PHOTOGRAPH BY MISS E. K. KAY, C. E.

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NO. 7

THE WORK OF THE UNITED STATES BOARD ON
GEOGRAPHIC NAMES

By HENRY GANNETT,

*Chairman of the Board and Chief Geographer of the U. S. Geological Survey
and of the Truth and Eleventh Circles*

This board was originally constituted in the early part of 1890, as a voluntary association of officers of various departments of the government for the purpose of securing uniformity in the official spelling of geographic names. It was the result, in the main, of the efforts of Dr T. C. Mendenhall, then Superintendent of the U. S. Coast and Geodetic Survey, who was chosen its first chairman. It was given standing and authority by an executive order of September 4, 1890, which reads as follows:

"As it is desirable that uniform usage in regard to geographic nomenclature and orthography obtain throughout the executive departments of the government, and particularly upon the maps and charts issued by the various departments and bureaus, I hereby constitute a Board on Geographic Names and designate the following persons, who have heretofore cooperated for a similar purpose under the authority of the several departments, bureaus, and institutions with which they are connected, as members of said board. . . . To this board shall be referred all unsettled questions concerning geographic names which arise in the departments, and the decisions of the board are to be accepted by these departments as the standard authority in such matters." . . .

The board now consists of representatives of the following departments and bureaus: State, War, and Navy departments, Light-House Board, Coast and Geodetic Survey, Geological Survey, General Land Office, Post Office Department, and Smithsonian Institution.

During the five years or more of its existence the board has held 48 meetings and has decided 2,845 cases. Its *modus operandi* is simple and direct. The cases of disputed nomenclature which reach it are referred at once to an executive committee consisting at present of the representatives of the Geological Survey, Navy Department, and Coast and Geodetic Survey. An investigation of each case is made by this executive committee, which reports it, with recommendations, to the board, which makes a final decision. For such decision a majority of the entire board is necessary. It not infrequently happens, therefore, that it is only by a unanimous vote of those present at a meeting that definite action can be taken.

Geographic names may be broadly distinguished into two classes: those which are established by usage, commonly local usage, and those which are not so established. In regard to the former class, the primary principle which controls the decisions of the board is that local usage ought to prevail. What the people call themselves and what they call the natural features lying within their jurisdiction should, unless there is good reason to the contrary, be the names thereof. That this is just and proper surely goes without saying. In general, every man has a right to insist that other people call him by the name which he selects and accept that spelling of his name which he chooses to adopt. The rights which a man has over his own name, a community has over its own name and over the names of all natural features lying within its jurisdiction. Lest it should appear that I am dwelling too much on this aspect of the case and arguing a self-evident proposition, let me quote from an article recently published in *Justus Perthes' Geographische Mittheilungen*, which will show that there are men, and men of eminence, too, who do not accept this principle.

"The practical Americans have had since 1893 a Bureau of Geographic Names. . . . The establishment of this Bureau on Geographic Names and its first decisions were referred to in our last report. We gave a hearty greeting to the new creation, and added to the greeting a few suggestions; but these have not been considered. Nay, more, the later decisions of the board, about 700 in number, relating to geographic names at home and abroad, correspond still less to the most reasonable expectations. We miss the principle that the original form of the name, the meaning and etymology of the name, the motive for naming, is to be considered, and considered first and foremost. We miss the scientific spirit, which, instead of cleaving to the form, unlocks the intrinsic meaning, and accordingly we miss in the works of a government board of names all evidence of acquaintance with toponymic literature."

Summarizing a discussion which took place before the National Geographic Society on the subject of geographic names, the same author says:

"Only the last named among the four speakers has a word to say in behalf of the original forms of the nomenclature introduced by discovery and exploration, or received from the Indians; but his championship is timid and surrounded by wide reservation. . . . Nowhere do we find the principle laid down that the original forms of names, especially Indian names, which are so true to life, are to be preserved as much as possible. A board of names has no easy task. It has not merely to give 'decisions,' but also to base these decisions on thorough study, and to inform the public, so far as necessary, of the grounds on which they are made. We wish to know from what variations the form selected has been picked out; and this statement will serve to show the amount of knowledge of literature possessed and the scientific principle followed, and will itself win for the decision the confidence of the interested circles. Only this method turns out solid work; any other procedure merely replaces private caprice by official caprice. This official caprice is able to turn a 'Golfo Triste' (sad bay) into a 'Gulf of Triste,' thus manufacturing a personal name or place name, Triste, after which the bay must have been named. It is well known that this feature is the arm of the sea between the Orinoco and Trinidad, to which the Dragon's gorge forms the northern entrance, a passage which was described and feared even in the time of Columbus, because ships, driving with spread sails under brisk west wind against the mighty current of the Orinoco, are exposed to danger. The above-mentioned decision of the board of names has masked the physical fact and formally falsified an expressive geographic name."

With regard to this case, it may be stated that the board has made no decision whatever. It has not come before it.

"In the United States and elsewhere there are undoubtedly an infinity of names and places of obscure origin, and for which a decision has to be made without giving reasons. Be it so. We recognize the necessity where it exists; but just as positively must we demand that the decision be made on scientific grounds whenever possible."

Dr Egli, the writer of this article, is well known as one of the leading geographers of Europe and one who has given much attention to this subject of geographic names. It seems to me clear, however, and in that view I know that I share the opinion of the other members of the board, that he is radically wrong in the views he here presents. He states the exact fact when he says that "We miss the principle that the original form of the name, the meaning, the etymology of the name, the motive for naming, is to be considered, and considered *first and foremost*."

It is true that the board attaches little importance to these

matters. On the contrary, its fundamental principle, as before stated—a principle which has controlled many hundreds of its decisions—is that local usage, the prevalent usage of the people living in the neighborhood, should be followed. By this it is not meant that local usage has absolutely controlled in all cases. Departures have been made whenever, for other reasons, such a course seemed wise, but this principle has controlled the decisions of the board in nine cases out of ten. I have already touched on its validity. Concerning its expediency, I may say that unless the decisions of the board are adopted by the people and generally followed its work will be a failure. It was constituted not to restore corrupted forms to so-called pure forms, but to secure uniformity of usage. There is not force enough in any government, at least not enough in the government of the United States, to make the people do what they do not wish to do. To fly in the face of the community is like attempting to dam up a river and force it to flow up hill.

To adopt as the "first and foremost" principle the one formulated by Dr Egli, that the original forms of names be restored, would lead to some startling results, results which he surely does not fully appreciate. Geographic names in the United States have been modified, changed, distorted, corrupted, if you will, to an astonishing extent. To throw aside these corrupted but well established names and replace them by old and forgotten forms would involve wholesale changes, such as would find no following among the people of the United States. The name which was accepted fifty or a hundred years ago is not the name in use at present; today the people accept something else.

An example of corruption is seen in the name *Hoboculy*, applied to a creek in Missouri. The original will, of course, be recognized as *Roue Brulé*. Again, *Rain* river, Wisconsin, was originally the *St. Esprit*, which, translated, became *Spirit* river, and thence, by some pundit, rendered in its present form. For a whole century Wisconsin was spelled *Ouisconsin*. Would there be any right or propriety in reverting to that spelling and requiring the citizens of the Badger State to adopt it in place of the present form? Shall we attempt to revive the name *Illinok* or *Illinowack* in place of *Michigan* for one of the Great Lakes, *Owabash* for *Wabash*, and apply it to the Ohio river, or call it *La Belle Riviere*? Should we substitute *Kichí Gumí*, *Grand Lac*, *Tracy*, *Canlé*, or *Algona* for *Lake Superior*, and *Thankton* for *Yankton*? Shall we call the Mississippi the *St. Francis*, the

Colbert, the Conception, or the St. Louis; shall we change Missouri into Missouries or St. Phillip, and Iowa into Ioway?

We might go on and quote thousands of names that have been changed to a greater or less extent, but these few will suffice to illustrate the matter. Examination of old maps of the United States shows that a majority of the geographic names now in use have been changed since they were first applied; consequently it would be utterly impracticable to ignore the forms to which the people are now accustomed, even if there were no impropriety in so doing. In short, it is impossible, even were it desirable, to restore the original forms of names.

The principle above enunciated is a far-reaching one, and it will be well, before entering upon a discussion of the exceptions which the board makes to it, to follow it and see to what it leads us. The names of many features in foreign countries have from time out of mind been known to English-speaking people by names other than those applied by their inhabitants. The Germans call their country Deutschland, the Indians call theirs India, the Spaniards España. The citizens of certain places in Italy call their cities Lavoura, Roma, Venezia, but we call them by other names in a way that is utterly unwarranted. Every American tourist having a Frenchman call our country Les États Unis, and properly, for it is not its name. There is no more sense in translating a geographic name than a person's name. A name is not a common coin, that it should be translated. The time is apparently not ripe for adopting the home names of all foreign geographic features, but, speaking for myself, I have no doubt that it will soon be feasible to institute this reform. Indeed, in almost every individual case of this sort that has been brought before the board the decision has been rendered in favor of the home name.

The universal adoption of this principle would, however, lead to many inconsistencies. For instance, in many cases what is plainly the same name appears in different parts of the United States as a designation of different features, with different spellings. In such cases should these different spellings be unified? The tendency of the board doubtless is in that direction, but in many cases they not only run against strong local usage but against legal authority as well. Wichita, Washita, and Quachita are the same word; so with Wyandot, Wyandotte, and Cuyandot. All are familiar with the name Allegheny, *berry, bay*, applied to counties in New York, Pennsylvania, Virginia, West Virginia,

and North Carolina, and to mountain ranges and a river. As a county name it is spelled in three different forms, each of which is fortified by legislative acts, legal documents, and no end of local usage. It is desirable to make the spelling uniform; but can it be done? In such a case the board is between the devil and the deep sea. Consistency in following local usage produces inconsistency in orthography. In some cases of this sort, when the board was of the opinion that local usage could be overcome, it has adopted a uniform spelling, but in other cases it has refrained from making decisions.

In the matter of geographic names, as in everything else, development is constantly going on; names are continually changing, being modified in some cases slightly, in other cases radically. Is it best that this development should be suffered to go on blindly, as development has proceeded throughout the world in times past, or will it be more economical and will the results be more satisfactory and be attained at less cost if it be guided intelligently? Surely no one will hesitate to admit that the latter is the better condition. Recognizing this course of development in geographic names, the board has studied it with a view to ascertaining its trend, of discovering what changes are going on, and what their result is likely to be in the future, and, acting upon the knowledge thus acquired, it has endeavored to guide the course of development into the best channels, so as to produce good results from it as speedily as practicable. The most marked direction in which development is proceeding is that of simplification. Useless letters are being dropped, hyphens are being omitted; appendages to names, such as the word city, town, court-house, cross-roads, etc., are one after another being dropped. The possessive form of names is being given up. Life is too short to expend it in writing these useless words and letters. Names consisting of more than one word are being run together into one word. In these and many other ways the course of development is toward simplification and abbreviation. Of these changes the board heartily approves and it is going as fast and as far in the direction of furthering them as it believes the public will support it. To go faster or to go further at the present time would be to discredit itself, and this the board prefers not to do. Another tendency in development is toward uniformity in spelling. Certain names ending in *burg* were formerly spelled *burgh*, others *berg*, necessitating constant reference to gazetteers in order to learn whether the

removed all final *h* or *wh*. The word at the stroke relieved the American public of the necessity by striking off the *h* in every case. The same thing was done with the termination *opsis* of

many unformly applied *opsis* wherever it appeared as a part of a geographical name.

There is no other class of names to be considered, that is, names in respect to settled parts of the country where there is too broad usage. These are names of Indian origin, and they may be said to be still in an unsettled state, like the country in which they are found. How do we obtain Indian names? The spelling given to an Indian name represents the way in which some white man has extracted some Indian to pronounce it, and every one knows that in such a case there will be just as many different spellings of an Indian name as there are white men to extract and Indians to pronounce it. From our Northwest we

learn that there are perhaps twenty different versions, and each version just as correct as the other. In such cases the board selects from among the different versions the one which serves to represent the sound the best of all, and most simply.

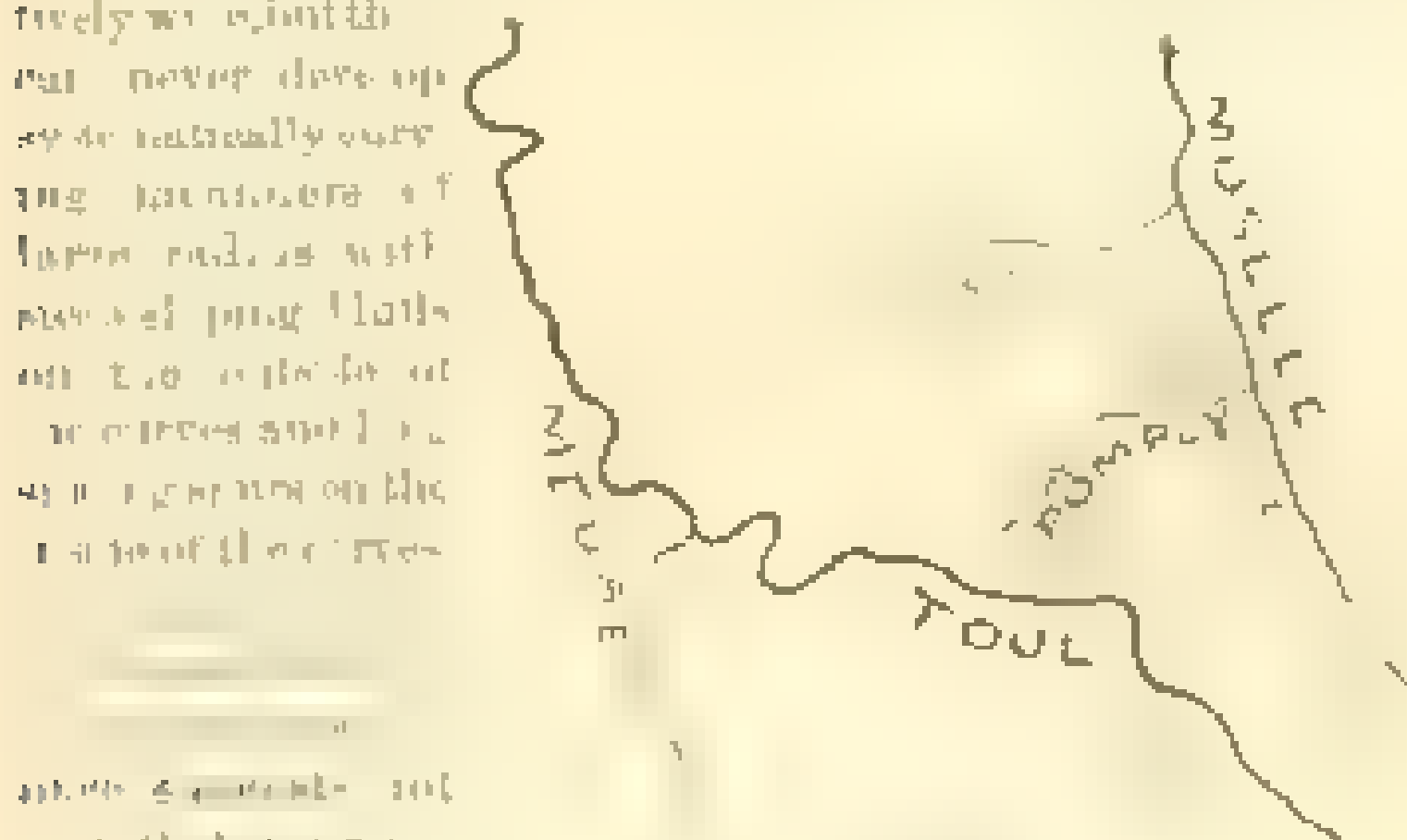
Early in the life of the board a long list of Alaskan names was submitted to it for decision. These names were referred by the board to some half dozen gentlemen, a few of whom were known as Alaskan geographers, and the subsequent decisions were based upon the weight of evidence submitted by these specialists. Of course, the decision is not a universal pleasure and persons unacquainted with Alaskan names

in the matter of names in unsettled countries would be disappointed in the purity of the board's decision to adopt the spelling of the nation having jurisdiction there.

The work involved in making these decisions is in the main simple in character. Although much of it involves investigation and consultation with every one is very good, depending mainly on finding out what people call themselves. The matters with which the board are concerned are not, as a rule, scientific matters. They are mainly matters of fact or judgment. The board is often criticised for inconsistency in its decisions with having decided one way in one case and in a different way in another case which appears to be quite similar. I think the board is quite ready to place I quite to the credit of its consistency, but with explaining these reasons, since consistency in certain matters involves inconsistency in others.

direction often assumed by the valleys of large rivers, have never originated by valleys of small streams. It is true that the valleys of small streams may in the course of time become comparatively wide, but this

and never develop as the naturally occurring polymers of higher order, as with several polyblends on the order of 1000-2000 g/mole, and on the order of 1000-2000 g/mole.



1. \mathbb{R}^n 上的函数 $f(x)$ 称为 n 次齐次函数，如果

* It is noted that after surgery with a lumbar disc.

At the second place of books, I never recall at home to purchase books in the neighborhood of Toul, it is seen that we



The road was a
very good one,
and it was
very well kept.
The road was
very good and
it was very well
kept.

members of \mathcal{C} and \mathcal{C}' of which the height ring Λ may be taken as the type ring in consequence of adding the axiom

line of the Toul in the north, by a low volume of the Pannier the valley has been constantly deepened both above and below the former level of capture below the former level of the river and now with its (and steep-sided) trench characteristic of recent capture. Not only the diverted Toul but several of the tributaries above the place of capture have a marked terrace level formed by the general level of the open valley plain of lower level, to which they formerly flowed. On restoring the surface of the old valley floor by filling in the trenches which now descend it, it may be seen to slope at such a grade as would lead to the floor of the meandering valley on the way to the Meuse. Immediately after the diversion of the Toul we may

ascend from the valley slopes, was led to follow the meandering valley to Meuse. This would be the course of the abandoned stream of our former day. But in consequence of the development of the low trench at the bow of capture and the accompanying growth of the subsequent stream, the depression which the old Pagny has been a full foot or so, steepened and is now not more than two and one-half miles in length.*

The Pagny and the Ingrosson.—Let us now turn our attention to the main subject to consider some special features of the meandering valley and its present occupants, the Ingrosson and the Ingrosson. In the first place, it always in the valley at the village of Pagny, there is a small stream coming up from the hills to the north. The topographical details of this district give good reason for thinking that this little stream used to join the valley of Layest-Renay on the next meander to the west, and that we have here a representation of an section of the so-called "meander type." When the vigorous Toul was running through this valley and winding its meander belt it must have, guided its availing current so vigorously against the outer side of its curves that it cut through the ridge separating the Pagny meander from the meander on the north, and thus enlarged the mouth of its own tributary from a flow to a vigorous member. This may be admitted as a possibility, and we accordingly the former passage of a meander through the meander of Layest.

Next as to the subsequent Ingrosson, the head is at least 15

* This is shown by the following sketch.

Deposition of the Meuse and the Moselle at Pagny, showing the old Toul and capture at Pagny.

• The valley floor at section of Ingrosson (Pagny) is shown.

in the first place. The comparative narrowness of the trough at a given point below the elbow of capture by Teal would not lead us to expect an oblique, well-streamed reach of any length and I therefore suggest the following explanation of the rather surprising length of the Irgeisen. A lake southwest of Foug is the narrowest part of the old valley, its narrowness here being due to the greater resistance of the *grès à billes*, which form the high land through which it is cut. From these steep slopes it appears that a high, faint amount of water has swept down into the valley roughly, collecting it more or less and producing a stream of small, limy sand. The occasional bony remains of a deep channel to be at its centre through this obstacle.

It probably accumulated in a lake or a shallow lake above a local obstacle, the lake on overlying it, the water at the bottom of its part of its course reversed, as a result of flow, and thus gave rise to an oblique stream of a somewhat different type which is now the Irgeisen.

All this, however, only by way of suggestion. Further study of the geological aspects of the country is necessary before the suggestion deserves acceptance. There nevertheless may be no doubt on the general point concerning the diversion of the Teal from the Meuse to the Moselle, seen by my mind to be confirmed by the perfectly satisfactory geological facts from the Vosges and over the land in the valley of the Meuse below Foug. The diversion of the mouth of the valley, the westward flow of its bluffs and rivers, the gorge above a lake with the elbow of capture at Teal, the result of the old valley plan, the work of the gorge was cut to the floor of the wandering valley that leads it through the upland and the result of that happened to the Irgeisen stream at Foug, all combine into an systematic arrangement of parts as to leave no doubt that an explanation would not be far from the truth and a good and simple process is the best explanation.

The abandoned Meuse—Looking now again at the Meuse below Foug, we must recognize it as a river whose color is due to a mass of water by the action of an important tributary to a river system. Its volume having diminished, it is a mile or so below Foug, the large curves of the valley and point instead a type of a river, the same as it suffers along the valley floor. Not only so, having lost volume, it seems rather to have a slow, gentle slope as a land assumed when its volume was larger, for its flood plain now has every appearance of having

in more times as an indication of a river which has changed its bed in time, increasing its slope when its volume was large and decreasing its slope when its volume was small.

What the Mosque has lost the Mosquito has gained, and the explanation is that the Tail has given to its volume an

equilibrium of its lower valley, even to the point of cutting alluvium quite through at the neck of its narrow spur.

The Arc and the Spur. In this we look at the rise of the Arc. This rise was an enlargement of the Mosque on the western side of its basin, but it has been diverted to give the volume of



the basin. The elbow of capture in this rise was a short way west east of the Mosque. The Arc comes from the south and here takes a sharp turn westward through the belt of lower strata or a stream bed, being the first of Arcs since this place. An Arc, at direct continuation of the course of the Arc, occupies a valley leading to a Mosque. The bed of the stream, the given or length of this valley is to lower valley, and a small stream is the last. But where the valley is made strong in members of soil of alluviation, the Bar is shown. In a hole back, this wriggles here and there, back and forth, on the valley floor. The slopes of

the valley floor have the same approximate steepness, steeper slopes at the outside of the curves, gentler slopes on the inside. As, at it, enters one of the new spurs from the upland on the west covered by the high ridge near St. Agnes, has a narrow neck and the road leading from the Mosque to the Sink system has cut a track through the neck instead of going around the spur. (See Plate V.)

The magnitude of the former greater volume of water in the stream that once swung bodily around the neck was of the valley are perfectly conclusive. If it were the little Bar subjects

flowing in the most random manner, quite a mile to be taken before reaching the mill-races and the narrow bed of the necks of the square by running systematically against the outer side of the valley curves. The rainbow-like colouring of the flat valley floor suggests that the Bar has ascended its course since the greater volume of water was withdrawn at the time of the great flood, revealing the features of the Meuse about Caumery. Following

the river and stony channel for a long distance, but the latter

near Caumery the meadow is little without more drainage than is given by such a bed as the farmers have cut here and there for the better carrying of their fat, more or less. After a further half the small meandering barbed valley, we entered a small stream, presumably one of the Moselle, Beugnot and Aron flowing southward for seven miles, a tributary along the valley, reaching to the elbow of capture above the old Pri. This is the back-ground of stream by whose growth from the elbow of capture the detached Bar has been progressively more and more narrowed.

Whether a diverting point existed at present existing between the two meadows, long ago, the detached Bar has been determined in this case by the general nature of deposit washed in from the valley slopes, as it apparently was in the case of the Pri. I cannot surely say, but the evidence of point to bar and the similarity between the Bar captured for the amount of widening of the Bar since it has received at least now of capture and for the headward growth of the backland bed frequently Agre. As in the case of the Tine, upper Moselle, so with the Aron, the old valley floor, occupied at a time when it at a far down the valley now occupied by the Bar is easily recognized in the detached Bar-like headland in either position from the elbow of capture, but the Bar has now over the old and the old of the diverted Aron, the narrow track of the reversed of the Aron. A river can be seen there, dammed by the trend of the Aron for some distance, the stream from the elbow of capture, and, of course, also through the Bar valley floor of the diverted on the way to Aron, but in passing no longer

it makes but a slight deviation in the meadow.

One of the most interesting points of view for the representation of this example of river arrangement is on the flat fields of the

to be as that one. I belonged to the Meuse. The riverbanks on which the Tou was given over to the Saine and the Aire to the Aisne may be called the primary and the secondary respectively, the latter ultimately delivering the prize amount to the Saine, the Saine to the Meuse. The beheaded streams of the two are the Pagny and the Sar. The former is so insignificant that I have had to invent a name for it, finding no name for one so small, and even the "Murs du Pagny" entered on the *Etats* report of 1841-42, 43. The latter is the best example that I have ever seen of a beheaded stream trying to first make its way to the coast but instead of the great process of

The denuded Meuse again.—The loss suffered by the Meuse and the Saine gorges, by the Saine through the diversion of the Aire are of no great amount, but as far as they go they serve to confine each river in the limits that now enclose them. The

and unforming the two long battle. It should be noted, however, that when a large tributary is diverted from a point high on the trunk of a main river, the loss of volume that the change produces may be a large fraction of the total volume that ever belonged to the main river, and hence that the loss may greatly affect the ability of the main river still to follow down its long valley that it cut out when its volume was greater. On the other hand, when a tributary of relatively small volume is diverted from some point near the mouth of the main river the loss that is produced will be a comparatively small fraction of the trunk volume, and the change of habit that is produced will be correspondingly small. It is for this reason that the staggering of the Meuse river to Germany is so much more serious than between Sedan and Metz. The loss of the Tou at the Moselle was a much more serious affair for it is almost tantamount to the loss of the Aire.

Supplementary problems.—I have not certain aspects of this problem that remain to be considered fully. First, are there any other examples of branches diverted from the system of the Meuse to the use of its neighbors to the west and east? Although I have been unable to do so, my direct means of learning the map have still not seem to be inclined on that other rivers can have occurred. On looking at the Meuse above Pagny, it is there almost as much out of proportion to its valley as it is heavy

higher up than the up at Moselle, even but diverted. Looking at the Aire, it appears that our present radius of investigation was a smaller than the radius of the swinging valley that is shown by the little bar, and from this it may be inferred that not only the existing Aire, but the drainage of a still larger basin once ran down the valley of the bar. Perhaps the dotted line represents the swinging of the old channel valleys that the Aire once possessed, and I cannot find a reason why it should not accept the fact. The maps on the same of I should seem to be a sufficient action to enable one to solve the puzzle of the problem. What is the solution? The whole subject is for examination study in the field, and a more interesting problem could hardly be selected for a student's work.

Another subject in which no reference has yet been made is, nevertheless, of fundamental importance to the whole problem: Why is it that the Seine, and the Moselle are warping at the expense of the winding Meuse? Why do they possess an advantage which the other rivers and streams is not? If it could the Meuse ever have gained as large a drainage area as it now must have had, if at a later stage of its history it were to come nearly alone of its branches? This is no large a problem to offer for upon now, but it certainly two claims that it may be briefly stated. One is that many of the stream in the region

along the straits of the younger stream and their valleys have long ascending slopes on the eastern side and probably the same on the western side. The highland is composed by these streams is determined by the outcrop of more resistant strata than those of the valleys which the streams have excavated. Geological and streams of the kind I have called "a bar pond" believeing that they must have originated in an unstable or unstable of the original slopes of the land surface when it first arose above the sea, but that their productivity came later when the waste of the work and the downward growth of streams above their strike, after the manner explained in connection with the adjustments of the Maine and its branches near Châlons. The Meuse and at least some of the other streams at Châlons had therefore to seem themselves to have been the result of depressions estimated on the territory of some still earlier river or rivers, and if this is true, the sympathy but the present unprovenanced condition of the Meuse, even as is not corrected.

However this may be, why is it that the Meuse has been



[illegible]

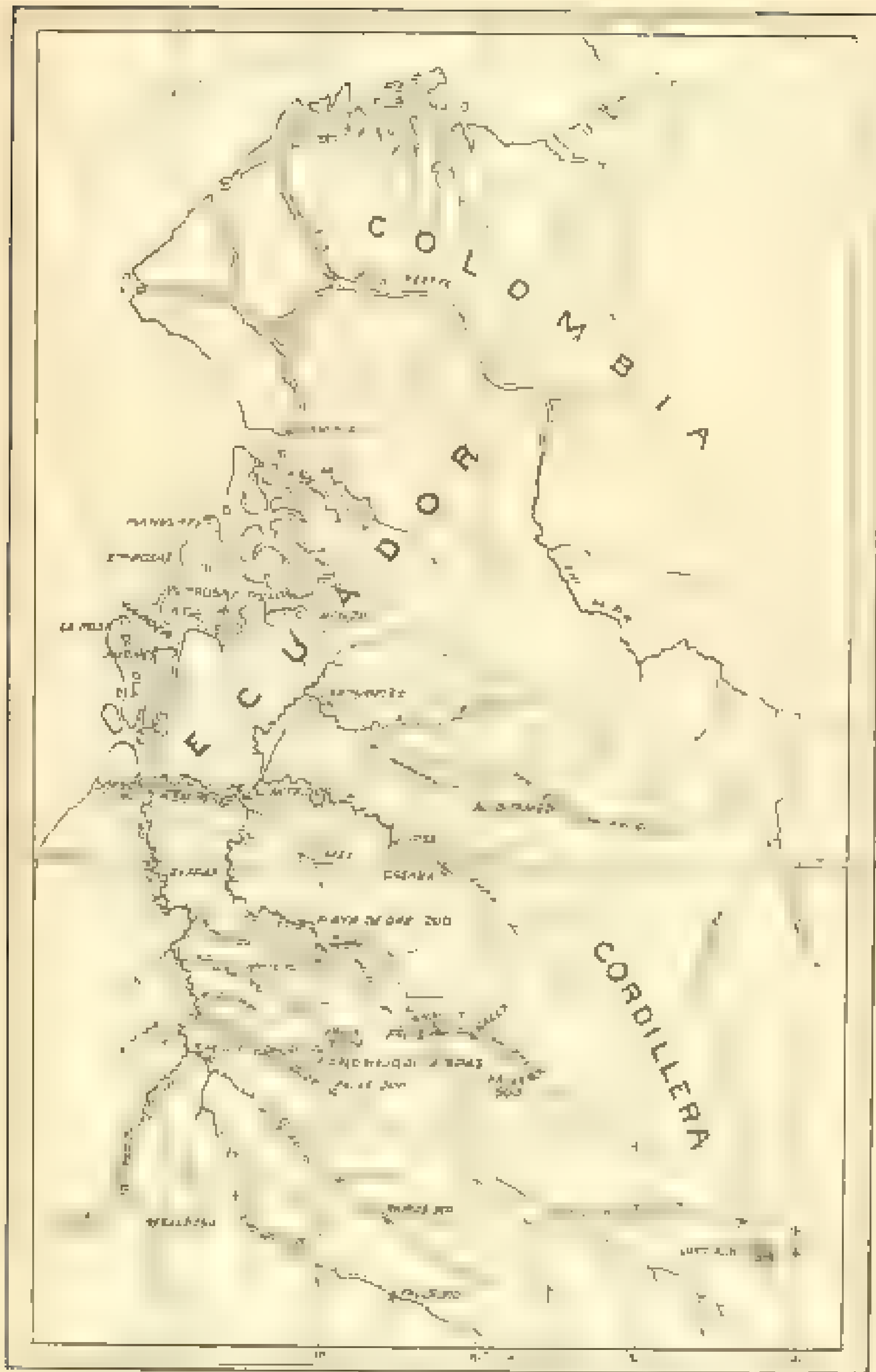
A JOURNEY IN EDUCATION

Dr. Blake L. Kiger, Jr.

I left Ft. Smith on June 20, 1901, and two days later reached my first stop at Fort Smith. Here is Captain, Mr J. L. Cherry, as well as a number of their officers. I had been to the valley, probably the richest district in quartz and precious stones in Southern America. There stood here a large completed box car, some twenty or forty miles from the town. This, great in length, the quantity collected by workers.

On the 10th I arrived at Tanager, on the borders of Colima, and remained at the mouth of the Mucuna stream to go at once to the Patavara and to receive another canoe to take to the temple of Chalchicomula, then as yet the only means of crossing the only ways of reaching the interior from the coast. At Tanager I obtained a fine view across, from the bridges, and appreciated the river better than at any other place I visited.

The next rock formation in Ecuador is the *Sa. Inga*, between the river and the Marañón, at 14,611 water level and above, formation of sand, which is generally traversed by cracks in perfect parallel to the river, or outside of it, as in the formation of Ecuador transport or is extremely rare, as the *Andes* rise abruptly from the plain, cutting out in the formation peaks of *Chimborazo* (20,481 feet) and *Cotacachi* (19,480 feet). The only region of sand is the interior in Ecuador is the



Map of the Cordillera region in Colombia, Ecuador, and Peru.

Scale: 1 inch = 10 miles.

Source: U.S. Army.

to get the forest to wrap itself into the Andes at an elevation of 11,800 feet just south of Chumborazo.

On the journey from Lima I was accompanied by the most unusual Netcha. The first day I was stopped for the night on the slopes of Chumbor. The vegetation was dense and thick, and in places was a street of vines completely across the narrow way. Many different kinds of parrots flew and were in the fields, woods and fields and a few monkeys took night rides and were as noisy as monkeys like a remark caused my friend to burst his side from under his leafy canopy in the canoe I inquired, "What is that noise?" I answered "An owl's shriek." He soon dropped back under his parth and when he ventured out in the morning remarked, "We did not enter a country, where even the owls were dark."

We followed the river a passage to the mouth of Rio Santiago and ascended this river 12 miles to Isirion. The passage was so narrow and the vegetation so thick as to give the impression of floating through a forest. At Isirion we found a watch post which thereafter served as our base of supplies. The Spaniards knew of good places on the Santiago river two hundred years ago and left light in the shape of a watch post. The descendants of these slaves now people one stretch of the river near being over 1000. They crowded out the natives (the Cayapas Indians) about 1800 or earlier, who retired to another fork of the same river. At Isirion the Santiago forks, the left (north) and the right (south) branch branched out, where the right fork is called Cayapas, after the native tribe. The old civilization of South America and the old America seems to have been confined to the elevated plateaus, particularly in Peru and Ecuador and there only do we find ruins of the prehistoric civilization created by the Incas, such as those of Cuzco, Uman and Lake Titicaca. When Pizarro conquered this region in the earlier half of the sixteenth century many of these people had before the conqueror and established new homes along the banks of these tropical rivers, when he gave to the people after a few hundred years from 75 to 100 miles. These rivers would soon sweep out if they were not surpassed by the great power of their deluges, the Deluge of the Amazon. Santiago river and its branches rise in the snowy crest of the Andes, and the Cayapas Indians are probably never. In the time of the Incas, who conquered the whole of Peru, nor Spanish, related to remote tribes and had themselves aloof from strangers.



THE BUREAU OF THE ARMY

Along most of the river, extending from the Andes to the Pacific, the search for gold was found in small quantities by the Spaniards. In this eager search for the yellow metal the Indians were forced to give way, and now in the ravines along the banks of the Cayapas they meet no stranger than the Indian and partly negroid. The negroes have been used in many customs and useful in weaving, building, etc., for the Cayapas Indians, and, having retained many of the traits of their former African ancestors, combine with some of the worst traits of the Indian tribes, and are very cruel and unbecomingly malicious. The superstitions take the form of magic charms to prevent evil spirits, and especial trouble is taken to prevent the devil from taking possession of infants. Some respect is had for the priest who occasionally visits here, but with these negroes religion is only a thing of the superstitious.

But to return to my journey. On July 17 we left Lathoon and rode up the river for 28 miles up the Cayapas. Grasses, herbs, and bushes (most of the trees I saw here), and the bushes and tangled with the common trees, the beautiful the splendor of a tropical forest, and the mango with its spreading symmetrical foliage. These magnificent trees with their large

the eye is grasping reports on. With a host in silent a number of such a wealth of vegetation, we turned a sharp bend of the river and over the thatched huts of the natives could be seen the overhanging forest of the bananas, which reflected as well as the intensely dark hue of vegetation in the background. This was the main quarters of the Cayapas. A Juchitana presentation of seeds and fruits as food in a pleasant reception from each of us. He donated a canoe for us to take us up the river.

The house of the governor was on the left as the canoe. It was of these houses and was built like a long rectangle. The roof was flat. Two large fire-baked wooden boxes elevated about 3 feet or 4 feet above the floor and filled with sand, and a large flat stone sufficient for cooking purposes, a hole for smoke, and a large two can each side of the house like bay windows, served as the only apartments for the different members of the family. The men are well formed, of good stature, brownish with a very black hair, and splendid chest, and a point with a few women, some of whom do all the work, are generally small,

coarsely fat, and disfigured by thick streaks across their faces, neck, and breasts. They wear an oblong round cloth of hair

which is fastened

on the forehead between the ears is between two flat stones which

are secured by pieces of cotton dyed by rubbing out on a natural stone and resin through the cloth like wax. This cloth, all hand-made, was white, even and extremely fine. It was, from taking one of the figures and ending up of (cotton) and

of hand-made with pieces of hard wood laid across them. The like is a typical one. Sometimes they played on a wooden instrument like a harp. A fire of a sort of resinous wood burned brightly up the smoke would light full black. The day, and we were all of us by the evening's light of large houses and a few women, dressed bare of a dress-like or 1200.

Early the next morning we visited the temple of the great one, the chief. Here two large wooden pillars and three to either pressure the end of sticks and large in the middle of the pole. Detaching poles were placed conveniently near. All the apparatus had of recently been in use for some years.

They are also skilful in weaving hats, fans, and many other things from the bark of the palm and grasses. From the "palm" they make fish nets and other things, and they whirling a small stone in a circle, and keeping the net close to the bottom they catch the fish in a small space, and men, women, and children have great sport in spearing them. Besides this, the men are skilful in the art of fishing, and when the river is high and low, as can often be seen, with

an canoe in a number of ways of the most terrific sportsman.

It is said that the river becomes plain.

By some means of signal signaling our progress in the river was not lost, but thanks to the kind office of our friend, the

will permitted to pass along without payment. Along the whole

course of the river we found different dialects, e. g. in contrast to the style of these large bodies, similar to the language of the small streams, the words of the and eastern figures and of wood, were not and not from the generalization. The case of the river was the same from the head of the deer, and then by the order of the river, the latter seems confined to the bottom on the upper plateau, and I saw one of these on a small stream of the river, every body with perfect hair and features. This is the case of the river, and in how a nest of the river contained the remains of the country, they are the river language in the use of the river.

[illegible]

Later, reaching the head of our reservoir, we crossed river and made our examination of the place at once, and although the power of our wind sail is not so great as last night, my power was increased to 100, 150 and expended the breeze to the height of 100000 feet between the rivers Cayapas and Sula, and

We took a road and trail running into the steep, grassy hillside to the town of Antiochia. As we had had time to get so high on the river or at least the steepening, we saw many the Antiochia. On account of the heavy rain, a wet 30 miles a mile, it is very difficult to preserve negatives, and even, of all things, a camera is not allowed. A great many of my exposures were ruined, but most of the negatives were spoiled by the rain. Thus, my photographs are few and far between.

Leaving all our possessions & belongings at this camp, we did find our way out of the desert. Never had it been my experience, and I encountered such a wealth of vegetation

of insect life as I saw in the depth of the equatorial forest. Many-colored butterflies, brilliant humming-birds flitting and darting and the plaintive ever-sounding toucans, and Lizards were

and many others were numerous. The low vegetation was much greater here than on the Amazon drainage, the largest we saw being eight feet long and three inches thick. On some of the smaller streams one may see of reeds, the leaves growing in a fan-like way, by way of supporting the especially firm trees, and the whole constantly dropping into the stream as we passed. Two large cup-shaped tanks were filled with different species of tropical

fishes, and a grasshopper three or four inches in length, large fleshy, with two phosphorescent eyes, were plentiful. They had a crawling noise in flight. During the night we suffered much in our ears, not only from the drumming and buzzing of the insects, but also to prevent the pests from crawling into our sleeping

place. Five huts in a range of a river bank were well provided with provisions to eat, and some useful things as a supply of soap, of cane and palm leaves, and with three others I sought in the rear. The vegetation changed somewhat and became somewhat tropical in character, the red cedar predominating, and although there was not the same dense jungle as before, still the timber bush was luxuriant. Our immediate neighbors kept busy in cutting out the large large open and dense vegetation on which we extracted our path up the ridge. As we passed and the stream was full of many butterfly fishes. Toward evening the number increased and for some time they passed over our heads in perfect swarms like locusts.

We passed two faintly marked, grand and dramatic ledges of the rocky bank until it was too steep to even afford food. We then made a raft of light balsam wood and passed along the cliffs to the third fall. When, by our work, we pitched our tent along the edge of the bank about thirty-five feet above the water. For the sake of convenience our camp was well located, when the camp under a shelving rock about twenty feet above the water. Short water thick we found the first time, and in the morning, as we passed, before we had even time to realize what had happened, the water came down in a sheet of white foam and washed out kitchen, camp, leaving us

never let it sink. The water rose thirty feet, and then grew

After we left the river one high ridge was reached early in

the morning across the many forks of the Napayo branch. We made camp at or five in the day. One day, having a particularly rough and difficult journey to make, we failed to reach our camp and remained all night in a tent of convenience. The darkness fell early and suddenly a peal of lightning was heard, followed by a storm like a rushing furious wind through the tree-tops. The lightning approached us in a torrent, and torrents, well up on the high and smooth, and putting out our fire. The earth, like a sponge flung down, began, received and gave off its own thunder, making the air intensely damp. We sat up the rest of the night, clinging to the roots of the trees, hearing the whir of the variable birds, the buzz of countless insects, and the whirring of wild cats, with a large foliage on a porous brown and green from decayed vegetation spread a weird glow that only served to intensify the darkness.

On the fourth day we reached the main divide of a hillside overlooking the San Juan, 8,000 feet above the sea, and led up to the summit of Corralillo. This peak is isolated in the scheme of the vegetation and a narrow strip of forest and forest. It is a high and steep. At this point the Andes began to show their power and majesty, a forest of beautiful cascades over the cliffs and down, far in the vegetation below, we could see away from a snowy mountain, 15,000 feet above sea level.

After extending our route to the river we reached over one third and down the Canyon to the beach barriers at the mouth. For some reason we were avoided by the natives, as I remember, we were afraid of them. However, we did not

and in making a rough but interesting trip in a very short time

THE BERKELEY POWDER EXPLOSION

BY ROBERT H. CHAMBERLAIN,

United States Geological Survey

Mr Charles A. White* and Mr Arnold H. Johnson† have treated of the sounding variety of the sound. They have assumed an elevated ear to the strata in which the sound is produced. In some cases this fact is accounted for by the intervention of an object, such as an island or a mountain, but not infrequently there is no visible obstruction to the sound waves coming from the strata. It is my wish to present some facts that have come within my own observation and that show a direct relationship between sound waves and waves of motion generated by an object, hereinafter.

On Sunday, July 2, 1892, about 9 30 a. m., an explosion occurred at the point powder works at West Berkeley, California. The first explosion was a little "king-bomb," and about 100 pounds of nitroglycerine were discharged. About five minutes later ten three magazines blew up, the final explosion being the loudest. The total amount of powder and nitroglycerine exploded was about 250 tons. The shock of the last explosion was very severe, the column of smoke or flame rising to a height of at least 1,200 feet, and resembling a volcanic eruption. The damage at San Francisco, eight miles across the bay, was very great, many glass windows being broken, doors swung, and skylights out and in. The shock seemed to be all the heavier in the bay-ving portion of the city, and very far from the scene of the explosion, in the city quarter. It was distinctly felt by the engineer and passengers of a tug-boat crossing the bay 12 miles north of the works. A train only five miles from it was partially protected by hills, and no shock was noticed. At Napton 28 miles due north, the shock was distinctly noticeable.

About a round one-half a second after the end of the work and at about the same height of water is situated a large body of

water, the water is about 40 feet. The height of the sound at Fort H. and the other

* pp. 3 & 4, The course of the water.

and height of the water is about 40 feet. H. B. Johnson, pp.

Fig. 1. The explosion of the powder works at Berkeley, California, July 2, 1892. A. H. Johnson, pp. 3 & 4. W. H. Johnson, pp. 3 & 4.

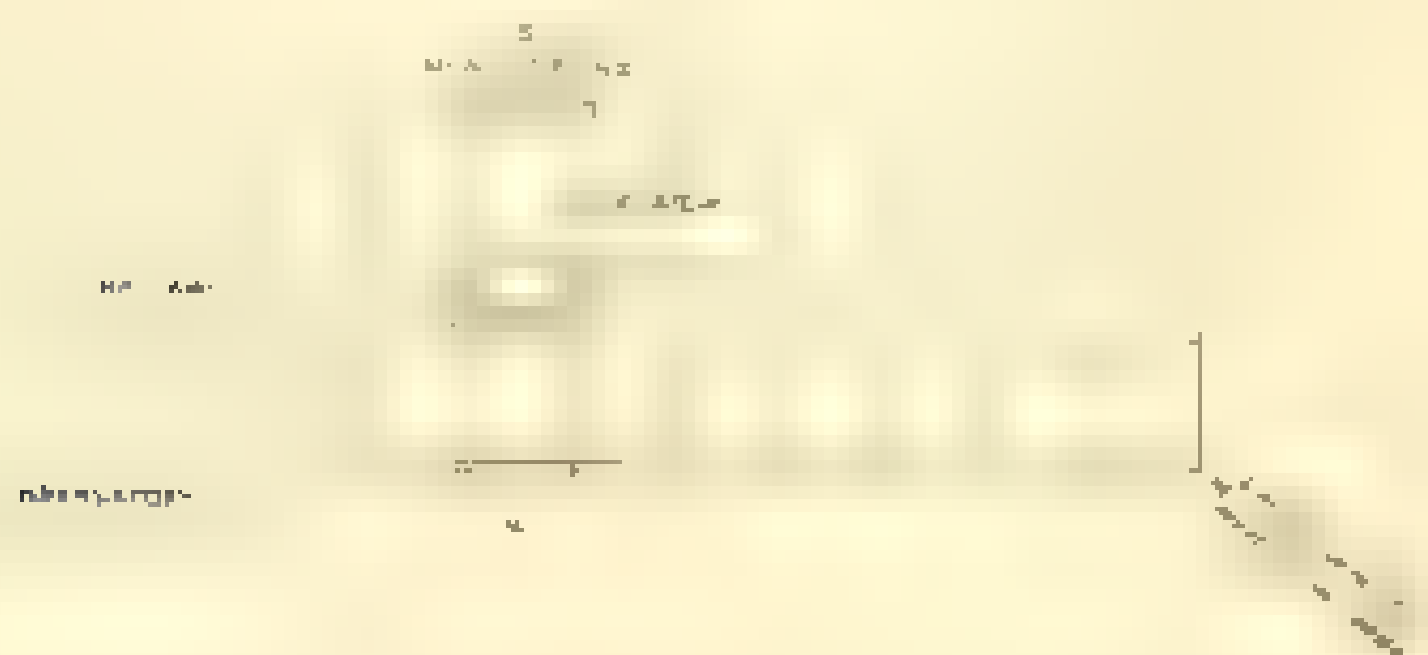
at night, and for hotel purposes, and having a great number of rooms and wind-ward. It was seen, at least, to be a good building summary, but the explosion occurred during vacation, and the present lot of the residents and his family were the only persons occupying it. Above. My most of the rooms were vacant at the moment of wind was caused. The dimensions of the building are about 200 feet in an east-west direction by 50 feet north and south, and it is several stories high. On the first floor are corrie-



on the first floor. The upper stories have a hallway running east and west for the entire length of the building, doors opening to rooms on each side of the hall, and transoms over the doors, with elevator and stairways in the middle of the building, as shown. The accompanying ground plan and profile, which, however, are given us correct only as to their general features for convenience, the wind was shown in the sketch are numbered vertically from the bottom and letters, consecutively from the left.

The contemporary on the first floor of the building was a very simple building and framework, the latter being covered with

ward, or toward the focus of action. All the windows on the western end of the building were broken while those on the eastern end were unharmed. The direction of the waves of motion was toward the northwest corner of the building. On examining the windows marked A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, and 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 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1000.



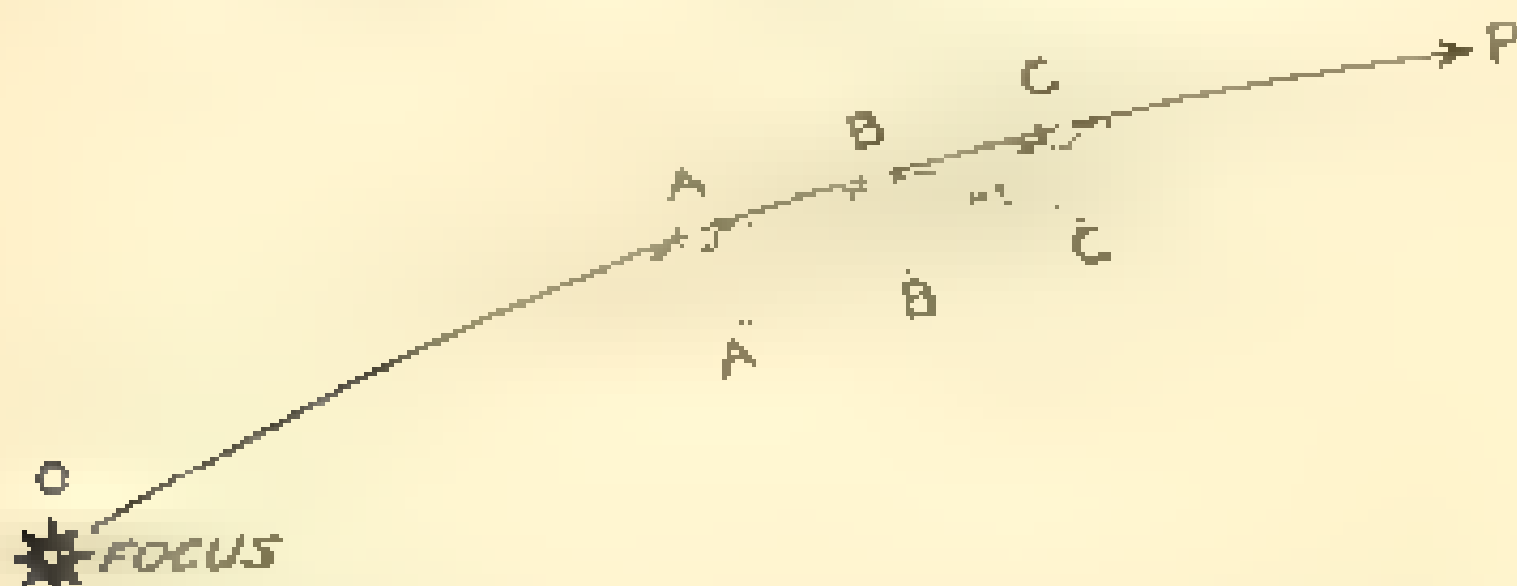
In the window room, and many windows on the south side of the building, the side exposed to the direct force of the explosion, were broken and many doors on the south side of the hallway were broken and damaged. The large doors at the entrance of the building on the south side were broken from hinges, lock and door bolt; one was blown in and the other blown out. No damage was noted in the vicinity of the entrance, where the air in the building was free to circulate. The general impression was that the doors were forced toward the entrance hallway, owing to the pressure of the contents. Look-

ing at the photograph of the building, it appears to have been subjected to a very strong force. This seems to bear out the assertion of Professor P. G. Tait, that in the case of a disturbance in a fluid to a very sudden extension of the fluid, or as in the case of a gas of hydrogen. It is prob-

It is not for nothing that the center of the action is of a spherical character.

The breaking of the tsunami over deeps, while the equator was interrupted by a low break, as if the waves were interrupted by a low break of the explosion are very interesting phenomena.

It was not for nothing that the center of the action was so far to be observed. The path of the maximum of the action was seen to be a large γ from the equal resistance of the air in which it is at the actual center of explosion: the pressure may be "excessive" at a very short distance from the center of the explosion. The changing pressure of the air was seen by Professor Langley's experiments, and the shape of the funnel of an explosion is a clear one, and its center is at the maximum of the wave. From the focus, the air forming it is a spherical wave, and the air is a spherical wave, the path of the air particles is a spherical wave.



A, B, and C are air particles in the path of a spherical wave moving from the focus O to P. The motion of each is first along the line of O P, away from the focus, a result of direct action of the particles on the focus to its original position or near it, the track forming a circular curve. When the particle is in the position A', B', or C', its motion is toward the focus O to an explosion, and so any motion of the particles would be evidenced by a track of air, as is expressed by the force of the air wave. In the case of the tsunami, the motion of the air particles was a wave, the path of the air particles was a spherical wave, and the air particles were in a spherical wave.

* *Rept. Acad. Sciences, with others, vol. 17, p. 40.*

The numerous products of the United States in the calendar year 1892, as a total value, according to the manufactured article listed by the U. S. Geological Survey, of \$11,755,340. This amount, although nearly constantly greater than that for the previous years, was less than in 1880, 1881, 1891. The quantities of the principal items were, however, greater than ever before, while the values were in many cases less, owing to the reduction in prices.

It is most noteworthy indeed in the fact that in the case of pig iron, it is done to 9,144,808 long tons, and the value nearly 62 per cent, i. e., from \$65,867,247 to \$105,086,826. This production is the largest in a country has ever seen and is probably not far from doing it of the British empire. The increase in a year production has amounted, the amount produced being 47,000,000 tonnes or about 23 per cent since last year's figures. The production of gold has greatly increased, being \$1,040,000 against \$400,000,000 a year. The product of the French was amounting, as to most of the country. The production of copper was increased very big, being \$1,040,000 pounds. The production of lead has also increased, reaching 16 1/2 million tons. The output of iron amounted of 185,148, and the output of bituminous and 31,000,000 long tons of Anthracite in America. The output of iron last year was and no there in is the largest on record. The production of petroleum was 2,200,000 barrels of 42 gallons each, the largest amount ever produced, in a single year with the exception of 1901. The production of cotton was 4,000,000 bales of 480 pounds.

The enormous increase in use of these items, especially those of Japanese origin, I describe in chapters before the publishers with a few examples of our products responsive to an increased demand. For instance the surgeons of the United States were even using in the purchase of rubber in the event to admit a fact of that there are many of our products of 1914 were needed now more, and the different companies back a year ago of the new place of steel to supply their needs as of 1914 required. The result was a larger and more substantial for steel to be, yielding a great increase in price, names and figures were required, not to mention the very physical in the hands, result in the new situation, in an increase in the total output of nearly 42 per cent over the previous year. In the case of most of our industrial products the output was held on by the market. The supply and the cost of foreign goods increased as on the market to meet the possible demand.

GEOGRAPHIC NOTES

12

For example, if our advertisement were, simply for tele-broadcast purposes, to be
to be on the screen. Let us say and I think

4. **CONCLUSIONS** The results of the present study indicate that the use of the proposed method for the analysis of the data obtained from the experiments on the effect of the concentration of the solution on the rate of the reaction is more accurate than the use of the method of the initial rates.

14 1

While the 1960s nuclear defense agreement was in effect, the United States responded, with a policy of "deterrence by denial" and withdrawal of conventional forces from Europe. The net result is of the finding the Warsaw Pact failed to get even.

24. The number of new jobs accounted for 17,000,715 from the total placed in that category in 1947 and 74 weeks, against 102,402,941 from 1941 to 1945. The comparable period ended 14,250,000 weeks against 129,145,220 from 1941 to 1945. Such is now a more important export article than before. However, it is expected that it is growing very rapidly. Of the total foreign trade of nearly \$15 million each, Great Britain had over 25 million, the United States 20 million, Communist Europe including Russia 20 million, the United States 90 million, and the Russian Empire 1 million. Nearly all of the goods of this article are exported in the port of Shanghai. The

used to determine the age of an individual with 4.0% and 1.5% error respectively. Of 10000 subjects living in the 2 groups, 100 were between ages 14 and 19 years.

1. To A

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In each of several places. For A. J. Smith, the oldest magistrate at Yorkville, he got Sybilan, who sent him and his wife to a neighboring town where, according, his secretary found an unopened box of his papers.



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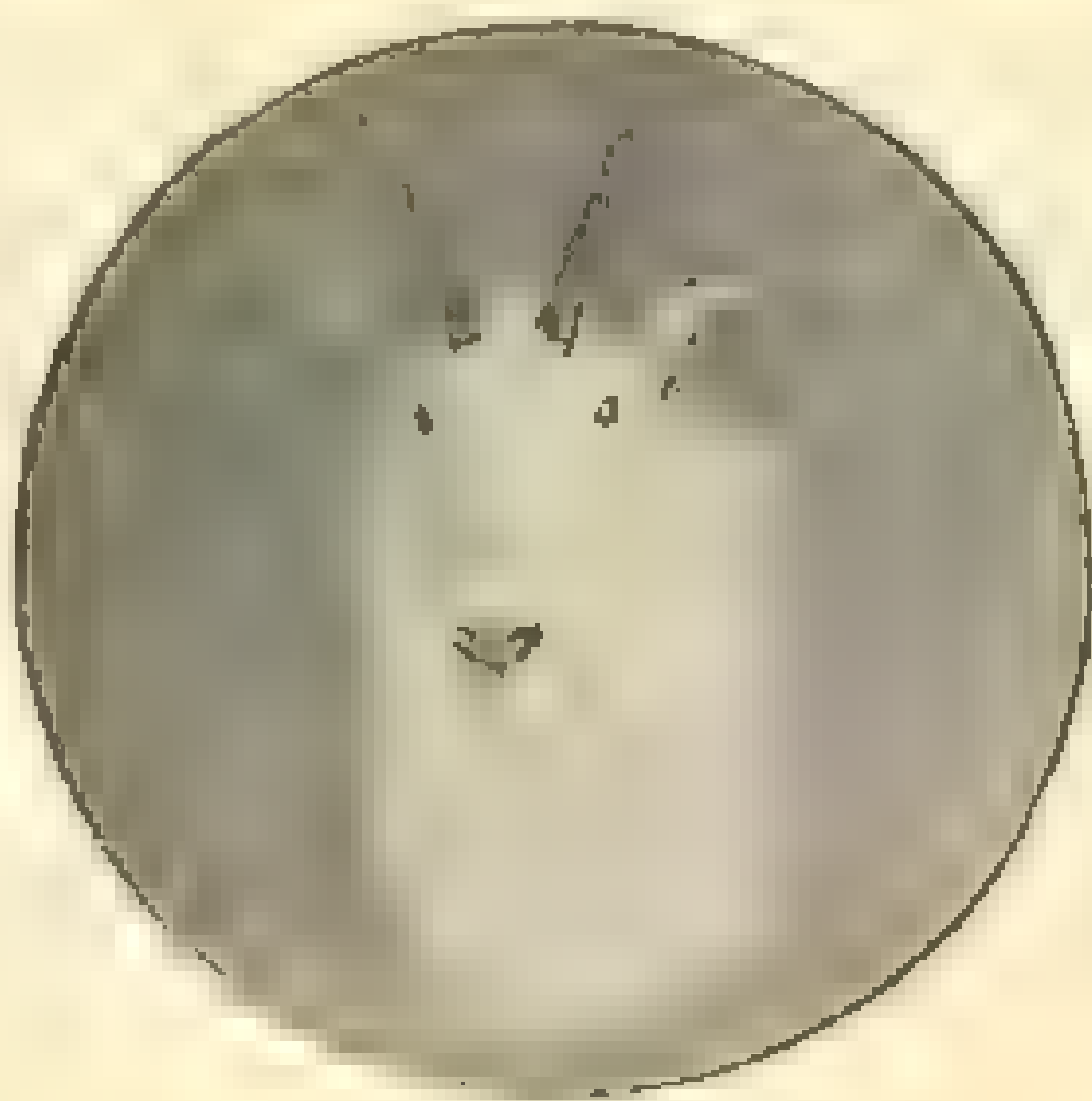
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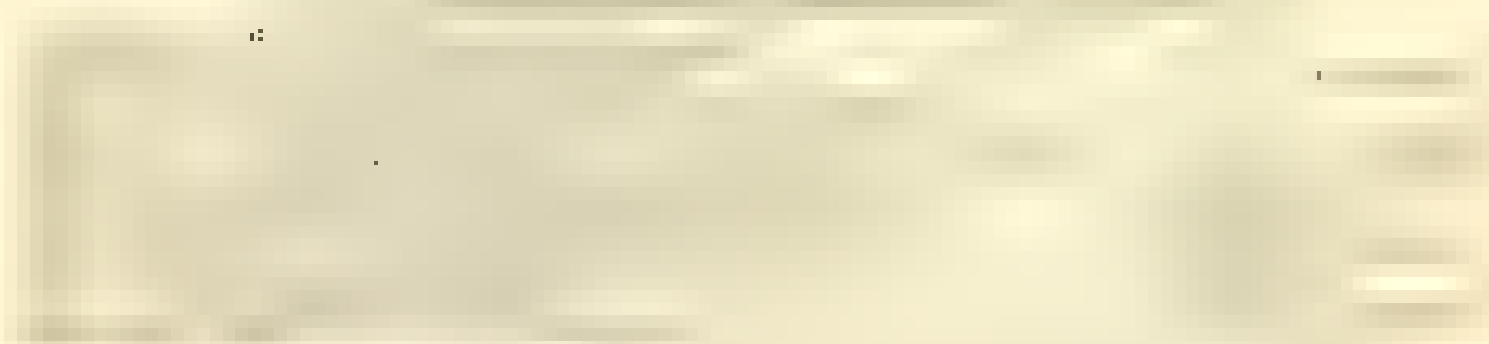
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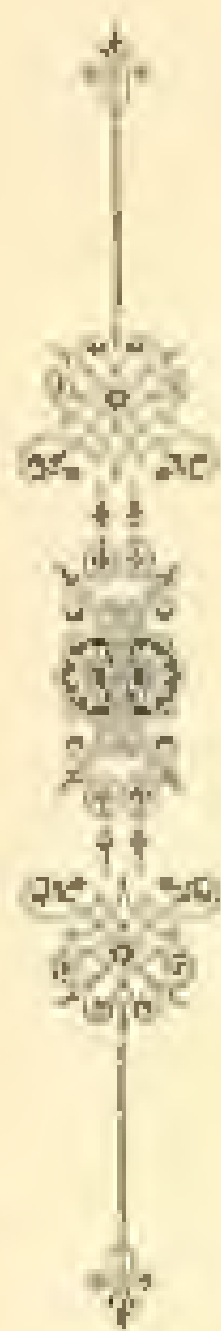
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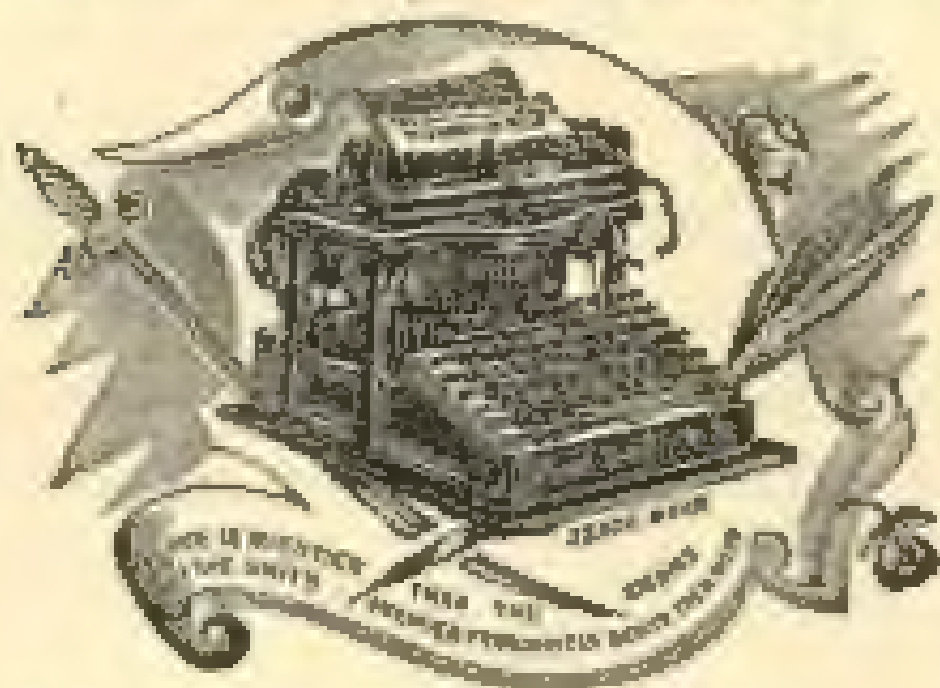
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